MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2015/2016

PTR0015 – TRIGONOMETRY

(All sections / Groups)

10 MARCH 2016
9.00 a.m. – 11.00 a.m.
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consists of **FOUR (4)** printed pages including the cover page and the appendix with 4 questions only.
2. Answer all **FOUR (4)** questions
3. Write all your answers in the answer booklet provided.
4. Only NON-PROGRAMMABLE calculators are allowed.

Question 1 (25 Marks)

a) If $w = 2 - 3i$ and $z = 5 + 2i$, find

i. $w + z$ **(3 marks)**

ii. $2w - 3z$ **(4 marks)**

iii. $w.z$ **(4 marks)**

iv. $\frac{z}{w}$ **(6 marks)**

b) Convert the following rectangular coordinates to polar coordinates.

i. $(\sqrt{3}, -1)$ **(4 marks)**

ii. $(-5,5)$ **(4 marks)**

Question 2 (25 Marks)

a) Use the information given to find the exact value of the six trigonometric functions.

i. $\csc\theta = -\frac{9}{8}$, θ in quadrant III **(6 marks)**

ii. $\sin\theta = \frac{2}{3}, \cos\theta < 0$ **(6 marks)**

b) Simplify the expression of

$$\sec\left[\sin^{-1}\left(\frac{\sqrt{3}}{2}\right)\right]$$ **(6 marks)**

c) To find the distance AB across a river, a distance BC of $955m$ laid off on one side of the river. It is found that $B = 105.5°$ and $C = 17.2°$. Find AB and round to the nearest meter. **(7 marks)**

Continued...

Question 3 (25 Marks)

a) Find an equation of the line with the given properties.

i. Containing the points $(2,-3)$ and $(-7,5)$. **(4 marks)**

ii. Parallel to the line $x+3y=6$, containing the point $(2,-1)$. **(4 marks)**

iii. Perpendicular to the line $-4x-y=3$, containing the point $\left(0,\frac{3}{4}\right)$. **(5 marks)**

b) The Cartesian equation of an ellipse is given by

$$2x^2+3y^2-20x+18y+71=0$$

i. Express the Cartesian equation of the ellipse in the standard form. **(8 marks)**

ii. Determine the coordinates of the center, vertices and foci of the ellipse. **(4 marks)**

Question 4 (25 Marks)

a) Find the value of x, y and z if given

$$\begin{bmatrix}2 & 6 & -8\\ 9 & -4 & 9\end{bmatrix}\begin{bmatrix}x & -4 & 6\\ 9 & y & -4\\ 8 & 2 & z\end{bmatrix}=\begin{bmatrix}-16 & -54 & -84\\ 9 & 2 & 151\end{bmatrix}$$ **(6 marks)**

b) Let $A=\begin{bmatrix}0 & -1\\ 6 & 0\\ 2 & 4\end{bmatrix}, B=\begin{bmatrix}-4 & 0\\ 1 & 1\\ 5 & 6\end{bmatrix}, C=\begin{bmatrix}-2 & 1 & 6\\ 0 & -5 & -1\end{bmatrix}$ **(5 marks)**

Find $C(A-B)$.

c) Solve the system using Cramer's Rule.

$$\begin{aligned}2x+4y-5z&=-8\\ x+5y+2z&=-1\\ 3x+3y+3z&=15\end{aligned}$$ **(14 marks)**

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APPENDIX

Trigonometric Identities

$$\cos^2 A + \sin^2 A = 1$$
$$\sec^2 A = 1 + \tan^2 A$$
$$\csc^2 A = 1 + \cot^2 A$$

$$\cos(A+B) = \cos A \cos B - \sin A \sin B$$
$$\cos(A-B) = \cos A \cos B + \sin A \sin B$$
$$\sin(A+B) = \sin A \cos B + \cos A \sin B$$
$$\sin(A-B) = \sin A \cos B - \cos A \sin B$$
$$\tan(A+B) = \frac{\tan A + \tan B}{1 - \tan A \tan B}$$
$$\tan(A-B) = \frac{\tan A - \tan B}{1 + \tan A \tan B}$$

$$\cos 2A = 2\cos^2 A - 1$$
$$\sin 2A = 2\sin A \cos A$$
$$\tan 2A = \frac{2\tan A}{1 - \tan^2 A}$$

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